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Fish marketed in an urban center of a sub-region of the southwestern Brazilian Amazon

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ABSTRACT

Reliable data on the fish species marketed provide important insights for the conservation of local fishery resources. Here, we recorded the fish species sold in the town of Eirunepé, Amazonas, Brazil, and the retail value of each species sold. We visited each one of the four fish stalls in the city on 10 occasions, with a total of 40 samples. During these visits, we acquired a specimen of each species being sold and recorded its sale price. We recorded a total of 57 fish species being sold at a mean price of R$5.88 ± 1.49 (± SD) per kilogram. Each species was sold at the same price at all four stalls. Two species, *Prochilodus nigricans* and *Brycon amazonicus*, had the highest Fish Importance Indices. Species composition sold did not vary among stalls. We observed more fish species being sold in Eirunepé than in the town of Tefé, one of the principal fishing ports in Amazonas state. The price of the fish was similar to that recorded in other towns within the same region. The key fish species recorded here are extremely important for the region's economy, including the generation of employment.

Keywords: Amazonas State; Eirunepé; fishery; Juruá River; fish trade.

Peixes comercializados em centro urbano de uma sub-região do sudoeste da Amazônia brasileira

RESUMO

Dados confiáveis sobre as espécies de peixes comercializadas fornecem informações importantes para a conservação dos recursos pesqueiros locais. Aqui, registramos as espécies de peixes vendidas na cidade de Eirunepé, Amazonas, Brasil, e o valor comercial de cada espécie vendida. Visitamos cada um dos quatro pontos de vendas de peixes da cidade em 10 ocasiões, para um total de 40 amostras. Durante essas visitas, adquirimos um exemplar de cada espécie a ser vendida e registramos seu preço de venda. Registramos um total de 57 espécies de peixes vendidas a um preço médio de R $ 5,88 ± 1,49 (± DP) por quilograma. Cada espécie foi vendida ao mesmo preço em todas os quatro pontos de venda. Duas espécies, *Prochilodus nigricans* e *Brycon amazonicus*, apresentaram os maiores Índices de Importância Pesqueira. A composição das espécies vendidas não variou entre os pontos de venda. Mais espécies de peixes são vendidas em Eirunepé do que na cidade de Tefé, um dos principais portos pesqueiros do estado do Amazonas. O preço do pescado foi semelhante ao registrado em outras cidades da mesma região. As principais espécies de peixes registradas aqui são extremamente importantes para a economia da região, incluindo a geração de empregos.

Palavras-chave: Estado do Amazonas, Eirunepé, pesca, rio Juruá, comércio de peixes.

Introduction

Fish are an important component in the human diet (PINTO et al. 2011, COSTA et al. 2013) providing a valuable source of proteins and some micronutrients essentials for a balanced nutrition and good health (COSTA et al., 2013; BÉNÉ et al., 2016; BEGOSSI et al., 2019). In the Amazon region, fish are the major source of animal protein for riverside and traditional populations, also providing to many families with a source of income or employment (SANTOS; SANTOS, 2005; FERRAZ; BARTHEM, 2016), with the excess catches usually sold on local markets (SANTOS; SANTOS, 2005; SANTOS et al., 2006; FERRAZ; BARTHEM, 2016). The fisheries in the region are primarily artisanal, being this practice often a family-based activity in the Amazon (SANTOS; SANTOS, 2005; FERRAZ; BARTHEM, 2016). These fishers predominate throughout the Amazon region due to its vast hydrographic basins, including the Amazon, Madeira, and Juruá rivers (BARTHEM; FABRÉ, 2003; LOPES et al., 2016), and high fish diversity (GALVIS et al., 2006; QUEIROZ et al., 2013). In general, artisanal fishers in the Amazon use nets to fish (CORRÊA et al., 2012) and may select fish of different sizes by varying the size of the mesh, optimizing economic gains by maximizing the number and biomass of fish captured.

Commercial fish species has different consumption demands. This aspect has a relevant impact in the fishery and, consequently, in the trade. In the Amazon, the *Arapaima gigas* (Cuvier, 1829) is one of the most valuable fish species. This species has a mean price of R$10.00 per kilogram, which is well above the mean price of fish in the region (R$5.00 per kg). However, several other fish species also command relatively high prices. One of them is the tambaqui *Colossoma macropomum*, which also has a mean price of R$10.00 per kg (FERRAZ; BARTHEM, 2016). These species are in high demand from consumers in both the Amazon region and other regions of Brazil (FERRAZ; BARTHEM, 2016). Other species such as the jaú *Zungaro zungaro*, which has a mean price of R$4.00 per kg, and the peacock bass, *Cichla* spp., with a mean price of R$4.43 per kg, are also in high demand in the Amazon region (COSTA et al., 2013). In the municipality of Tefé, a major Amazonas fishing port, for example, the local fishery of the aruanã *Osteoglossum bicirrhosum*, accumulated a profit of R$500,000 over a two-year period (FERRAZ; BARTHEM, 2016). These findings highlight the potential economic value of the harvesting of a single fish species in the study region.

Given the value of fishery stocks, in terms of both subsistence and the generation of income, one strategy implemented by the Brazilian government to maintain populations is the closed season (IBAMA, 2019). Closed seasons tend to coincide with the breeding season of target species, thus protecting them at a critical period in their life cycle. The exact period may vary in northern Brazil according to the state and the breeding season of the target species, as in normative instruction numbers 01/2005 and 35/2005, issued by the *Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*, IBAMA.

Reliable data on the trade in commercial fish species are vital to determine the demand for different species and the characteristics of the supply chain. A lack of data on the taxonomy and biology of the fish fauna exploited commercially in a

given region hampers the implementation of effective public policies for the conservation of fish stocks and other natural resources. In this context, we recorded the fish species sold in the city of Eirunepé, in the Brazilian state of Amazonas, verified the price of each fish species on the local markets, and the fishery importance index of the species for the region.

Material and Methods

Study area

The city of Eirunepé (6°39'40.0" S, 69°52'05.2" W) is located on the left margin of the Juruá River, in the southwest of the Amazonas state, Brazil, approximately 1,160 km from the state capital, Manaus (Figure 1). The entire municipality has an estimated population of 34,840, including both urban and rural inhabitants (IBGE, 2010). The region's climate is equatorial, with low thermal amplitudes and a mean annual temperature of 26°C (INMET, 2014). As Eirunepé city does not have any public or private fish markets, local fishers sell their produce from neighborhood stalls.

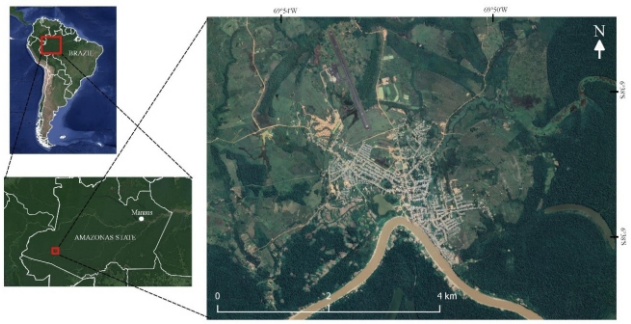

Figure 1. Location of the city of Eirunepé, on left bank of the Juruá river, Amazonas state, Brazil.

Data collection and analysis

We collected data in January, February, and March 2019, which corresponds to the flood period in the region, by visiting the four fish stalls in the city, defined here as sites A, B, C, and D (Figure 2). We visited all fish stall twice a week, with a total of 10 visits for each point of sale. To ensure the most reliable possible sample of fish species, we collected data between 8:00 am and 11:00 am, which is the peak period of fish sales. We acquired a specimen representing each species sold at each stall, which we identified following Santos et al., (2006), Galvis et al., (2006), Soares et al., (2008), and Queiroz et al., (2013), and we ask fishmongers for the commercial value of each species. We calculated the frequency of occurrence (%*FO*) of each species using the following formula: %*FO* = i / TE*100, where i = the total number of records of each species and TE = the total number of interviews, and the price per kilogram as %*P$* = i/P$*100, where i = the price per kilogram of a given species, and divided total values of all species, transformed into a percentage (adapted from ARTIOLI et al., 2009).

Figure 2. Four fish stalls in the Eirunepé city that we define here as sites A, B, C, and D.

We used the frequency of occurrence (%*FO*) and price (%*P$*) of each fish to calculate the Kawakami and Vazzoler index (1980), which was modified here as a Fish Importance Index (%FII): %FII = %F0 * %P$ / Σ(%F0 * %P$).

We identified the principal fish species by comparing the indices with the overall mean. Species with values above the mean index were considered most important.

We applied a multivariate non-parametric analysis of variance (one-way ANOSIM) to determine whether the composition of the fish species on sale at the different fish stalls varied significantly, based on a presence/absence input matrix (visits per site × species). The null hypothesis for the ANOSIM was that there was no significant variation in species composition among stalls, with this hypothesis being rejected at a significance level of $p < 0.05$ (CLARKE; GORLEY, 2006). The level of significance was tested by the permutation of the groups with 10,000 replicates. The ANOSIM *R* statistic provides a measure of the variation among the groups, with a global *R* of -1 being found when the groups analyzed are completely similar, $R = 0$, when the groups are completely random, and $R = 1$, when they are completely dissimilar (CLARKE; GORLEY, 2006). This analysis was run in the PAST software, version 3.0 (HAMMER et al., 2001).

Results

We identified a total of six fish orders during 40 visits to the four fish stalls in Eirunepé, being Characiformes (28 species), Siluriformes (18 species) and Cichliformes (seven species) the most representatives (Figure 3). These 57 fish species were distributed in 20 families (Table 1; Figure 3). The price of each fish species was the same at each fish stall and ranged from R$4.00 to R$12.00 per kilogram, with a mean (± SD) price of R$5.88 ± 1.49 per kg. The highest prices were recorded for *C. macropomum* (sold at R$12.00 per kg), the pirapitinga *Piaractus brachypomus* (R$11.00 per kg), and *Arapaima gigas* and the matrinxã *Brycon amazonicus*, which were both sold at R$10.00 per kg. The cheapest species was caximbo *Squaliforma emarginata*, which was sold at R$4.00 per kg. All the species sold whole and ungutted, except for *A. gigas* and the pirarara *Phractocephalus hemioliopterus*, which were marketed in the form of fillets or steaks. This last was sold at R$6.00 per kg.

The five species with the highest frequency of occurrence (*%FO*) were the curimatã *Prochilodus nigricans*, with a value of 82.5%, followed by the pacú *Mylossoma* spp. and the white piranha-branca *Pygocentrus nattereri*, both with 62.5%, the surubim *Pseudoplatystoma punctifer*, with a value of 60.0%, *O. bicirrhosum* with 57.5%, and mocinha *Potamorhina altamazonica* with a value of 55.0%.

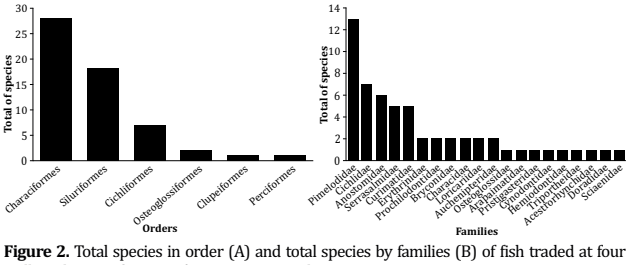

Figure 2. Total species in order (A) and total species by families (B) of fish traded at four stalls in the city of Eirunepé, Amazonas, Brazil.

We recorded 39 fish species at site A, where the most frequent taxa were *P. nigricans* (%*FO* = 90%) and *P. punctifer* (%*FO* = 80%). We registered 41 species at site B, where *Mylossoma* spp. was the most frequent taxon (%*FO* = 90%), followed by *O. bicirrhosum* and *P. nigricans*, both with %*FO* = 80%. We recorded 39 fish at site C, where *P. nigricans* (%*FO* = 80%) was most frequent, followed by *O. bicirrhosum* and piau-aracú

Pseudanos spp., both at %*FO* = 60%. Finally, in the site D, we recorded the smallest number of species (32 species), of which, the most frequent were *P. nigricans* (%*FO* = 80%), followed by the piau-lavrado *Schizodon fasciatus*, *P. altamazonica*, and *P. punctifer*, all at %*FO* = 70.0% (Table 1).

We were able to calculate the fish importance index for 21 species, with values ranging from %FII = 0.17 to %FII = 6.75 (Table 1). The five most important species were *B. amazonicus* (%FII = 6.75), *P. nigricans* (%FII = 6.69), *Mylossoma* spp. (%FII = 5.07), *P. punctifer* (%FII = 4.86), and *O. bicirrhosum* (%FII = 4.66) (Figure 3). No significant variation was found in the presence/absence of fish species among the stalls (ANOSIM: global $R = 0.048$, $p = 0.114$).

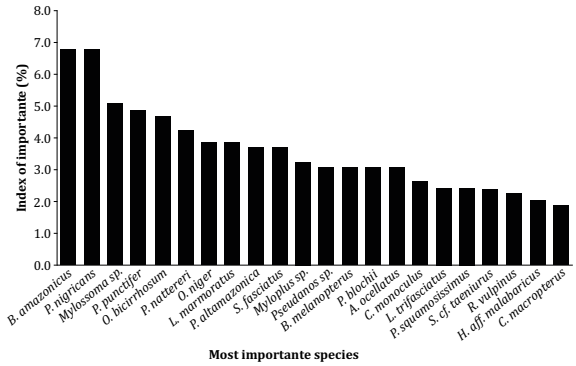

Figure 3. Most important species by the Fish Importance Index traded at four fish stalls in the city of Eirunepé, Amazonas, Brazil.

Table 1. List of commercialized fish species (Order/Family/Species), local common name, number of records (NR), frequency of occurrence (%FO), commercial value per kilo (R$/Kg) and index of importance of fish (%FII) of fish species recorded at four sampling points in the city of Eirunepé, Amazonas, Brazil. In bold are the highlights for fish with the lowest commercial value = *, the highest commercial value = **, the highest frequency of occurrence = [FO] and the highest importance index = [IP].

Order/Family/Species	Local common name	General			Site A		Site B		Site C		Site D		%FII
		NR	%FO	R$/Kg	NR	%FO	NR	%FO	NR	%FO	NR	%FO	
OSTEOGLOSSIFORMES													
Osteoglossidae													
Osteoglossum bicirrhosum (Cuvier, 1829) [FO, IP]	aruanã	23	57.5	6.00	6	60.0	8	80.0	6	60.0	3	30.0	4.66
Arapaimatidae													
Arapaima gigas (Schinz, 1822) **	pirarucu	1	2.5	10.00							1	10.0	0.34
CLUPEIFORMES													
Pristigasteridae													
Pellona castelnaeana Valenciennes, 1847	sardinhão-amarelo	2	5.0	6.00					1	10.0	1	10.0	0.41
CHARACIFORMES													
Erythrinidae													
Hoplerythrinus unitaeniatus (Spix & Agassiz, 1829)	Jeju	1	2.5	5.00							1	10.0	0.17
Hoplias aff. *malabaricus* (Bloch, 1794)	traíra	12	30.0	5.00	3	30.0	3	30.0	2	20.0	4	40.0	2.03
Cynodontidae													
Rhaphiodon vulpinus Spix & Agassiz, 1829	cachorrão	11	27.5	6.00	1	10.0	2	20.0			6	60.0	2.23
Serrasalmidae													
Colossoma macropomum (Cuvier, 1816) **	tambaqui	2	5.0	12.00			1	10.0	1	10.0			0.81
Myloplus spp.	mafurá	16	40.0	6.00	3	30.0	4	40.0	4	40.0	5	50.0	3.24
Mylossoma spp. [IP]	pacú	25	62.5	6.00	6	60.0	9	90.0	5	50.0	5	50.0	5.07
Piaractus brachypomus (Cuvier, 1818) **	pirapitinga	1	2.5	11.00			1	10.0					0.37
Pygocentrus nattereri Kner, 1858 [FO]	piranha-branca	25	62.5	5.00	9	90.0	6	40.0	4	40.0	6	50.0	4.22
Hemiodontidae													
Anodus cf. *elongatus* Agassiz, 1829	flexeira	5	12.5	5.00	1	10.0	3	30.0					0.84
Anostomidae													
Leporinus spp.	piau-banana	5	12.5	5.00	1	10.0	1	10.0			3	30.0	0.84
Leporinus friderici (Bloch, 1794)	piau-coco	1	2.5	6.00					1	10.0			0.20
Leporinus trifasciatus (Steindachner, 1876)	piau-matrinxã	9	22.5	8.00	3	30.0	2	20.0			4	40.0	2.43
Pseudanos spp.	piau-aracú	15	37.5	6.00	5	50.0			6	60.0	4	40.0	3.04
Rhytiodus spp.	piau-olho-de-gofo	4	10.0	5.00	1	10.0	3	30.0					0.68
Schizodon fasciatus Spix & Agassiz, 1829	piau-lavrado	18	45.0	6.00	4	40.0	6	60.0			7	70.0	3.65
Curimatidae													
Curimata inornate Vari, 1989	mocinha-peito-largo	1	2.5	5.00					1	10.0			0.17
Potamorhina altamazonica (Cope, 1878) [FO]	mocinha	22	55.0	5.00	3	30.0	7	70.0	4	40.0	7	70.0	3.71
Potamorhina latior (Spix & Agassiz, 1829)	mocinha-peito-fino	1	2.5	5.00					1	10.0			0.17
Psectrogaster amazonica Eigenmann & Eigenmann, 1889	casquinha	7	17.5	5.00	1	10.0	3	30.0	1	10.0	2	20.0	1.18
Psectrogaster rutiloides (Kner, 1858)	chorona	1	2.5	5.00					1	10.0			0.17
Prochilodontidae													
Prochilodus nigricans Spix & Agassiz, 1829 [FO, IP]	curimatã	33	82.5	6.00	9	90.0	8	80.0	8	80.0	8	80.0	6.69
Semaprochilodus cf. *taeniurus* (Valenciennes, 1821)	jaraqui	14	35.0	5.00	1	10.0	6	60.0	1	10.0	4	40.0	2.36
Triportheidae													
Triportheus cf. *angulatus* (Spix & Agassiz 1829)	sardinha	2	5.0	6.00			1	10.0	1	10.0			0.41
Bryconidae													
Brycon amazonicus (Spix & Agassiz, 1829) **, [IP]	matrinxã	20	50.0	10.00	4	40.0	6	60.0	6	60.0	3	30.0	6.75
Brycon melanopterus (Cope, 1872)	mamuri	15	37.5	6.00	3	30.0			5	50.0			3.04
Acestrorhynchidae													
Acestrorhynchus microlepis (Jardine, 1841)	dentuda	1	2.5	5.00	1	10.0	1	10.0					0.17
Characidae													0.00
Chalceus cf. *epakros* Zanata & Toledo-Piza, 2004	arari	1	2.5	5.00	1	10.0							0.17
Charax spp.	calengo	1	2.5	5.00	1	10.0							0.17
SILURIFORMES													
Loricariidae													
Liposarcus pardalis (Castelnau, 1855)	bodó	1	2.5	5.00			2	20.0					0.17
Squaliforma emarginata (Valenciennes, 1840) *	caximbo	1	2.5	5.00	1	10.0							0.17
Auchenipteridae													
Ageneiosus spp.	bocão	3	7.5	5.00			1	10.0			2	20.0	0.51
Parauchenipterus spp.	cangatí	6	15.0	5.00	1	10.0	2	20.0	2	20.0	1	10.0	1.01
Doradidae													
Oxydoras niger (Valenciennes, 1821)	cuiu-cuiu	19	47.5	6.00	6	6.0	6	60.0	3	30.0	3	30.0	3.85
Pimelodidae													
Calophysus macropterus (Lichtenstein, 1819)	pintadinha	11	27.5	5.00	4	4.0	2	20.0	3	30.0	2	20.0	1.86
Hypophthalmus spp.	mapará	6	15.0	6.00	2	20.0	1	10.0	2	20.0	1	10.0	1.22
Leiarius marmoratus (Gill, 1870)	jandiá	19	47.5	6.00	4	40.0	7	70.0	6	60.0	2	20.0	3.85
Phractocephalus hemioliopterus (Bloch & Schneider, 1801) *	pirarara	7	17.5	6.00	1	10.0	3	30.0					1.42
Plastysilurus spp.	braço-de-moça	8	20.0	6.00	2	20.0	2	20.0	3	30.0	1	10.0	1.62
Pimelodina flavipinnis Steindachner, 1876	moela	1	2.5	5.00			1	1.0					0.17
Pimelodus blochii Valenciennes, 1840	mandiim	15	37.5	6.00	4	40.0	3	30.0	5	50.0	3	30.0	3.04
Pinirampus pirinampu (Spix & Agassiz, 1829)	barba-chata	6	15.0	5.00			2	10.0	1	10.0			1.01
Pseudoplatystoma punctifer (Castelnau, 1855) [FO, IP]	surubim	24	60.0	6.00	8	80.0	6	60.0	3	30.0	7	70.0	4.86
Pseudoplastytoma tigrinum (Valenciennes, 1840)	caparari	3	7.5	8.00	2	20.0					1	10.0	0.81
Sorubimichthys planiceps (Spix & Agassiz, 1829)	piroaca	2	5.0	6.00			1	10.0	1	10.0			0.41
Sorubim cf. *lima* (Bloch & Schneider, 1801)	bico-de-pato	8	20.0	6.00	2	20.0	3	30.0	1	10.0	2	20.0	1.62
Zungaro zungaro (Humboldt, 1821)	Jaú	6	15.0	6.00	1	10.0	3	30.0	2	20.0			1.22
CICHLIFORMES													
Cichlidae													
Astronotus ocellatus (Agassiz, 1831)	caruaçú	15	37.5	6.00	3	30.0	4	40.0	4	40.0	3	30.0	3.04
Chaetobranchus spp.	cará	6	15.0	5.00	2	20.0	1	10.0	3	30.0			1.01
Chaetobranchus flavescens Heckel, 1840	cará-prata	1	2.5	5.00					1	10.0			0.17
Cichla monoculus Agassiz, 1831	tucunaré	13	32.5	6.00	1	10.0	7	70.0	4	40.0	1	10.0	2.63
Cichlasoma spp.	cará-vinagre	1	2.5	5.00					1	10.0			0.17
Crenicichla spp.	oláia	7	17.5	5.00	3	30.0	3	30.0	1	10.0			1.18
Satanoperca jurupari (Heckel, 1840)	cará-bicudo	1	2.5	5.00					1	10.0			0.17
PERCIFORMES													
Sciaenidae													
Plagioscion squamosissimus (Heckel, 1840)	Pescada	12	30.0	6.00	3	30.0	5	50.0	1	10.0	3	30.0	2.43

Discussion

Our study, despite representing only the flood period, provided a very robust list of species, which compares with other studies in the region in the state of Amazonas. In addition, we can draw a profile of the fish that is consumed by the local population and the financial collection that mobilizes the fish trade in Eirunepé. Our analyzes also allow us to verify the species with the highest levels of fishing importance for the city, which prioritize the conservation and maintenance of populations of these species. Therefore, conservation plans are essential for the fish community, at least for the species with highest importance index, which are sold and consumed in the region.

The number of fish we recorded in the present study is greater than the 46 species recorded in the fishing port of Tefé, in Amazonas (FERRAZ; BARTHEM, 2016). This difference may be related to those in either the diversity of the local fish faunas and/or more intense fishery activity out of the port of Eirunepé. Some species, such as cangatí *Parauchenipterus* spp. and bocão *Ageneiosus* spp., which are sold in Eirunepé, do not appear to be marketed at Tefé (FERRAZ; BARTHEM, 2016). However, in the city of Cruzeiro do Sul, in the state of Acre, which is also located on the Juruá River, the number of fish sold is 78 species (JACÓ et al., 2020). This number is a much larger than the recorded in Eirunepé and may be related to the data collection period in Cruzeiro do Sul, which corresponded to the entire year. Consequently, species of fish traded in flood and drought periods may have been accounted, while in Eirunepé our collect data was only during the flood period. According to other studies, the composition of the species may vary between seasons, i.e., the flood and dry periods (BARTHEM; FABRÉ, 2003; MATOS et al., 2018). Therefore, here we recognize that there could be variations of species collected if it had been collected during the entire year. In this way, future studies with data collection in the drought in Eirunepé can elucidate possible differences in fish species marketed between seasons.

The most important species sold in the Eirunepé fish stalls was *B. amazonicus*, being mainly associated with commercial value, however of the species most sold in the fish markets of the Amazonas state and in the Eirunepé port is *P. nigricans* (GONÇALVES; BATISTA, 2008; FREIRE et al., 2011; CORRÊA et al., 2012; FERRAZ; BARTHEM, 2016), together with *Mylossoma* spp., *P. punctifer*, and *O. bicirrhosum*, which are also marketed widely (SANTOS et al., 2006; GONÇALVES; BATISTA, 2008; CORRÊA et al., 2012; FERRAZ; BARTHEM, 2016). The relatively intense trade of these species in the region in general, and particularly in Eirunepé, certainly is related to several factors, including the high reproductive capacity of these species (MATOS et al., 2019) and their vulnerability to capture in gillnets. The price of these species and the acceptability of their meat to consumers contribute to their frequent availability at the local fish stalls. In addition, *P. nigricans* is one of the local fish that does not have a closed season, which means that it can be harvested legally throughout the year (IBAMA, 2019). Other species, such as *S. fasciatus*, the piau-aracú *Pseudanos* spp., and *P. nattereri*, also do not have a closed season (IBAMA, 2019), which may reinforce their frequency on the fish stalls of Eirunepé. *Colossoma macropomum* and *A. gigas*, on the other hand, do have a closed season, which may at least partially account for their lower frequencies in the present study, which may, in turn, contribute to their higher prices (FERRAZ; BARTHEM, 2016).

The mean price of fish in the Brazilian state of Amazonas is R$5.00 per kilogram (SANTOS et al., 2006; FERRAZ; BARTHEM, 2016), which was also the mean value recorded in the present study in Eirunepé. The price of a fish may nevertheless vary according to productivity, the size of the annual catch (LIMA et al., 2016) and periods of scarcity (FERRAZ; BARTHEM, 2016). In Cruzeiro do Sul, in Acre state, for example, the marketed fish costs much more expensive than in the entire Amazonas state, varying between R$4.00 and R$16.00 per kilogram (JACÓ et al., 2020).

In the Amazonas state, the total catch is estimated to be 270,000 tons of fish per year, and the region of Manaus is the principal center of both production and consumption (SANTOS et al., 2006). The annual catch landed at Tefé may exceed 2,000 tons, as recorded in 2010 (FERRAZ; BARTHEM, 2016). Whatever the variation in fish production in Eirunepé, fisheries appear to be one of the major economic activities in the municipality, combined with agricultural activities, generating income and jobs in the region (IBGE, 2010). The local fish trade would nevertheless benefit from the establishment of markets, i.e. public or private, associated with better facilities for the landing of catches.

The principal fish species recorded at the stalls in Eirunepé, i.e., *B. amazonicus*, *P. nigricans* and *Mylossoma* spp., are also among the main species marketed in other localities in the state of Amazonas (SANTOS et al., 2006; COSTA et al., 2013; FERRAZ; BARTHEM, 2016; MATOS et al., 2018). These species are fundamental to this economic activity and it is essential to ensure that their stocks are exploited sustainably in order to ensure the future of the locals' fisheries and its economy. Fisheries that exploit stocks intensively and indiscriminately or disrespect the closed season can often provoke a decline in productivity, with potentially serious implications for the local economy that depends on this activity. In this context, the findings of the present study, despite its limited temporal perspective, provide fundamentally important insights for the understanding of pressures on the stocks of commercially valuable fish species. We emphasize the need for long-term studies covering broader questions, such as large-scale fluctuations in productivity and economic parameters.

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